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STATE OF IOWA
DEPARTMENT OF COMMERCE
BEFORE THE IOWA UTILITIES BOARD

IN RE: COMPLAINT OF HANCOCK COUNTY HEALTH SYSTEMS	DOCKET NO. FCU-2013-0005

REPORT ON INVESTIGATION

Pursuant to the orders dated November 14 and December 16, 2014, the Office of Consumer Advocate (OCA), Iowa Department of Justice, submits the following report:

1. This formal complaint docket is one of six such dockets commenced at about the same time addressing intrastate rural call completion failures in Iowa. OCA has previously filed extensive reports in two of the other dockets. See *In re Complaint of Frahm*, No. FCU-2013-0007, report filed November 13, 2014; *In re Complaint of Rehabilitation Center of Allison*, No. FCU-2012-0019, report filed December 19, 2014.[1]

2. This report concentrates on the information specific to this docket. It should be read in conjunction with the earlier reports referenced above. It does not repeat the general information provided in the earlier reports. It does repeat, largely without change, the steps that OCA has suggested originating and intermediate long distance carriers should take as a means of restoring the reliability of the network and hence achieving a long-term solution to the problem.

[1] See also *In re Complaint of UnityPoint Clinic Family Medicine at Huxley*, No. FCU-2013-0004, report filed January 9, 2015.

NOTE: Confidential material has been identified by placing it between curly brackets {}.

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Hancock County Health Systems Complaint

3. In its complaint, filed January 15, 2013, Hancock County Health Systems alleged that its medical facilities were having "an awful time with call completion from our main campus to outlying numbers within our service area." According to the complaint, "[c]alls won't ring, calls won't answer and it seems to be getting worse not better." According to the complaint, the problem seemed to center on calls leaving the main campus and going to medical clinics, "specifically when calling from Britt Iowa to Kanawha Iowa."[2] As later appeared, on the morning of January 15, 2013, before 9:30 a.m., personnel at the Hancock County Memorial Hospital in Britt had attempted several times, from two different hospital phone numbers, to place calls to the Kanawha Medical Clinic in Kanawha, and the calls had failed to go through.[3]

4. As detailed in periodic reports submitted by OCA and Qwest Corporation d/b/a CenturyLink QC (CenturyLink), Hancock County Health Systems has at times reported additional call completion difficulties subsequent to the docketing of these proceedings on June 10, 2013.[4] Most recently, on January 8, 2015, Director of Facilities Curt Gast advised: "I have not fielded any complaints recently that I can attribute to hard

[2]Kanawha (population 652) is 11 miles south of Britt (population 2,069). Population figures are from the 2010 census.

[3]See letter from CenturyLink to Board staff dated February 4, 2013.

[4]In January 2014, Gast advised that he had again been receiving more frequent complaints about calls between Britt and Kanawha and that he had switched the local and long distance service from CenturyLink to a smaller, local vendor. See OCA report filed March 21, 2014. In July 2014, Gast reported dropped calls at the Wesley Medical Clinic in Wesley (population 390), 10 miles west of Britt. See OCA report filed July 29, 2014. In November 2014, CenturyLink, long distance carrier for the Wesley Medical Clinic, addressed six problematic calls on five dates in August 2014. According to CenturyLink, two of the calls were routed by carriers other than CenturyLink and hence beyond CenturyLink's ability to investigate, one involved a local call to a cell phone that may have dropped due to lack of cellular coverage, and two did not involve any difficulties on CenturyLink's network. On the one remaining call, CenturyLink determined that routing was the issue and removed intermediate "carriers" from the routing. Test calls then completed successfully.

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wired service. It is really difficult to know for sure because so many people use cell phones and dropped calls can be the norm for that."

CenturyLink Responses

5. In a letter to Board staff dated February 4, 2013, CenturyLink advised that, following CenturyLink's process for investigating call completion issues, a CenturyLink technician had opened a trouble ticket, investigated the trouble and the call paths, and determined the problem was related to the call routing. CenturyLink removed its intermediate carrier, IntelePeer, from the routing to the 641-762 NPA-NXX of the Kanawha facility. Test calls then completed successfully.

6. In discovery, CenturyLink confirmed its conclusion that the problem was the routing. OCA Exhibits CL-1, CL-4.[5] On January 30, 2013, CenturyLink removed IntelePeer from the routing to all calls in the 641-762 NPA-NXX of the Kanawha facility. OCA Exhibits CL-3, CL 7, CL-9. The technician manually changed the {[redacted]} routing table. OCA Exhibit CL-9. CenturyLink notified IntelePeer of the difficulty. OCA Exhibit CL-3. IntelePeer responded it was investigating the issue with its downstream carrier. OCA Exhibit CL-3. CenturyLink did not produce additional correspondence. OCA Exhibits CL-5, CL-6.

[5]CenturyLink's partially redacted trouble ticket (probably redacting the identity of the person or persons entering the notes) is not self-explanatory and provides less information than the call detail records provided by Impact Telecom (discussed in text below). All of the entries on the CenturyLink trouble ticket are dated January 30, 2013. {[redacted]} IntelePeer {[redacted]}. See OCA Exhibit CL-2.

7. Prior to the change, CenturyLink's intrastate routing sequence was: {[redacted]}. OCA Exhibit CL-10. IntelePeer was thus the *second*, not first, routing choice. OCA Exhibits CL-10, CL-13. Following the change, the sequence was: {[redacted]}. OCA Exhibit CL-11. When asked whether subsequent changes were made, CenturyLink responded that routing changes can occur on an ongoing basis but no other current intermediate carriers besides IntelePeer had been removed from the routing to the 641-762 NPA-NXX. OCA Exhibit CL-12.

8. {[redacted]}.[6]

9. When asked to explain the financial consequences to CenturyLink of removing IntelePeer from the routing, CenturyLink responded (i) another carrier was ahead of IntelePeer in the routing table sequence, and (ii) the difference in pricing between IntelePeer and the next carrier down in the sequence was small, so (iii) the financial impact of the change to CenturyLink was small. OCA Exhibit CL-13.

10. CenturyLink has no view into any intermediate carrier's systems. It works its complaints based on the input it receives from its customers and its intermediate carriers. OCA Exhibit CL-23.

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[6]See No. FCU-2012-0019, In *re Complaint of Rehabilitation Center of Allison*; No. FCU-2013-0004, *In re Complaint of UnityPoint Clinic Family Medicine at Huxley*.

11. When asked whether CenturyLink had received other complaints regarding call completion failure to the 641-762 NPA-NXX, CenturyLink referenced a series of spreadsheets provided by CenturyLink in No. FCU-2012-0019, *In re Rehabilitation Center of Allison*. OCA Exhibit CL-16. These spreadsheets show only one other complaint to CenturyLink, on February 6, 2012, regarding call completion related difficulties on calls to the 641-762 NPA-NXX during 2011, 2012 and 2013. The difficulties on that complaint were not described in the spreadsheet.

12. The number of complaints does not necessarily reflect the extent of the difficulties. As Mr. Gast observes, many people use their cell phones when an attempted call fails. See paragraph 4 above. As a result, the difficulties are not recorded. While Hancock County Health Systems evidently submitted no subsequent complaint to CenturyLink, it did at times report subsequent difficulties in response to inquiries directed by the presiding officer. See note 4 above.

13. IntelePeer first became an underlying carrier for CenturyLink on October 16, 2005. OCA Exhibit CL-19. CenturyLink declined to produce the contract. OCA Exhibit CL-18.[7] At the time it entered into the contract, CenturyLink was doing no testing prior to completing the contract. In response to requests for testing results both before and after services commenced, CenturyLink produced a standard test plan but no test results. OCA Exhibits CL-20, CL-21.

[7] A motion to compel may have succeeded in obtaining the document. See *Harris v. Board of Governors of Federal Reserve System*, 938 F.2d 720, 723 (7th Cir. 1991) ("The rights of a party to obtain documents under judicial process are not enjoyed at the sufferance of third parties who have agreed between themselves to keep documents secret"). Constraints of time and resources, however, prevent OCA from pursuing every hindrance to exhaustion.

14. When asked whether it has any information that would assist the Board in addressing whether the use of IP switching technology at some point in a call path may have an effect on whether a call attempted actually goes through to its intended destination, CenturyLink responded in part:

> Providers in the industry groups (Alliance for Telecommunications Industry Solutions Packet Technologies and Systems Committee is one such group) continue working to determine if moving between different signaling and media platforms impacts call processes. Calls processing to and from IP to TDM, wireless to TDM, CDMA to SS-7, PRI to SS-7, MF to SS-7, all of those to SIP, are some examples of call processing across platforms. As calls cross the different platforms, there could be issues, however those need to be addressed on a call by call basis.

OCA Exhibit CL-24.

IntelePeer Responses

15. IntelePeer was a financially troubled company acquired by Peerless Network, Inc. in November 2013, and subsequently renamed Airus, Inc. See *In re* Complaint *of Frahm*, OCA report dated November 13, 2014, ¶ 12.[8] OCA received discovery responses from IntelePeer prior to the acquisition and Airus subsequent to the acquisition. Airus does not have possession of all pre-acquisition IntelePeer documents.

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[8]IntelePeer described itself as follows:

> IntelePeer, Inc. is a leading provider of Internet protocol ("IP") communications services to service providers and enterprises and a privately held corporation headquartered in San Mateo, California. IntelePeer is transforming communications by delivering multimodal offerings, including voice and video, across devices, networks and geographies . . . . IntelePeer delivers more than 23 billion minutes annually over . . . sophisticated and intelligent routing software . . . by exchanging traffic with more than 130 other service providers, in addition to between more than 450 million telephone numbers and end point identifying addresses . . . . Our solutions allow wholesale and enterprise customers to transition from legacy telecommunications networks to next-generation, all IP-based communications in a rapid and cost-effective manner.

Comments of IntelePeer, Inc., *In re AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, et al.*, GN Docket No. 12-353 (FCC Jan. 28, 2013).

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Airus {[redacted]}. See *Frahm*, OCA report, ¶ 13.

16. In a letter to Board staff dated February 20, 2013, IntelePeer advised that, following IntelePeer's process for investigating call completion issues, an IntelePeer technician opened a trouble ticket, investigated the trouble and the call paths in conjunction with CenturyLink, and determined the problem was related to the call routing. IntelePeer removed its downstream intermediate carrier, Impact Telecom, from the routing to the 641-672 NPA-NXX of the Kanawha facility. After the change, test calls went through successfully.

17. In discovery, IntelePeer explained that its process for addressing trouble tickets included {[redacted]}. OCA Exhibit IN-6.[9]

18. In this case, there is no documentation that IntelePeer followed these processes. IntelePeer produced limited correspondence with both Century and Impact and the call detail record one of the calls on January 15, 2013. OCA Exhibits IN-1, IN-9, IN-10, IN-11. These materials show that IntelePeer contacted Impact on January 30,

[9]While in IntelePeer's control, the calls routed {[redacted]}. OCA Exhibits IN-4, IN-5.

2013, advised that IntelePeer had "just received another PUC complaint over your route," then asked that Impact open a trouble ticket, investigate and "503 the call back" if no determination can be made. OCA Exhibit IN-1.

19. When asked what "503" meant, IntelePeer responded: "The literal meaning of the SIP 503 code is "NO CIRCUIT AVAILABLE." Customers ask vendors to establish the SIP 503 code in the vendor network. With the SIP 503 code in place, vendors return any call not completing to its destination, so the customer can route advance around that vendor for the call." OCA Exhibit IN-17. In using the term "customer," IntelePeer evidently refers to the upstream carrier, in this instance IntelePeer.

20. {[redacted]}. OCA Exhibits IN-3, IN-7, IN-8, IN-12. {[redacted]}. OCA Exhibit IN-1.[10]

21. When asked to explain any financial consequences to IntelePeer of the change, IntelePeer responded:

{[redacted]}

[10]IntelePeer's removal of Impact from its routing would have had no effect on actual calls from the Britt facility to the Kanawha facility, because CenturyLink had removed IntelePeer from the routing.

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{ [redacted] }.

OCA Exhibit IN-13.[11]

22. None of the correspondence produced by IntelePeer shed any light on the cause of the problem. When asked to explain the cause of the problem, IntelePeer responded "[t]here is no way for IntelePeer to know the 'precise cause of the problem,' because IntelePeer was not informed of an issue until weeks after the call and was not able to replicate the issue at that time." OCA Exhibit IN-2.[12]

23. According to data provided by CenturyLink in No. FCU-2012-0019, *In re Complaint of Rehabilitation Center of Allison*, { [redacted] }. See OCA report, filed Dec. 19, 2014, ¶ 47.

24. When asked whether IntelePeer was aware of other call completion complaints on calls to 641-762 destinations, IntelePeer provided evidence of five such complaints, summarized in the footnote.[13] OCA Exhibits IN-14, IN-15.

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[11] Airus provided considerable information regarding the rate decks. That information is discussed in OCA's report filed November 13, 2014, in No. FCU-2013-0007, *In re Complaint of Frahm*, ¶¶ 34-37.

[12] IntelePeer produced one call detail record for one of the calls on January 15, 2013. OCA Exhibit IN-11. According to IntelePeer, this trouble ticket "did not indicate no audio." IntelePeer offered no explanation for why it did not produce call detail records on the other calls on January 15, 2013. The call detail records later provided by Impact Telecom (discussed in text below) are more complete. The times shown on the call detail records are Greenwich Mean Time.

[13] { [redacted] }

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25. When asked whether IntelePeer had removed Impact from the routing on calls to any destinations other than NPA-NXX 641-762, IntelePeer responded the information was not readily extractable from its systems. OCA Exhibit IN-23.

26. IntelePeer produced the contract, {[redacted]}, between itself and Impact. Section 2.2 {[redacted]}. Section 5.1 {[redacted]}. OCA Ex. IN-22.

27. When asked to provide a listing of any tests that IntelePeer conducted as a means of assuring the ability of Impact to complete calls properly, including the dates of the tests, a description of what the tests measured, and the results, IntelePeer stated the most recent testing with Impact prior to the Hancock County Health Systems complaint had been in November 2011. OCA Ex. IN-18. IntelePeer provided no test results.

28. IntelePeer and later Airus provided information, not specific to this docket, regarding the metrics and standards used to evaluate the performance of downstream carriers, as well as information regarding available sanctions when standards

{[redacted]}.

are not met. That information was presented and discussed in OCA's report filed November 13, 2014, in No. FCU-2013-0007, *In re Complaint of Frahm*, ¶¶ 76-82.

29. {[redacted]}. OCA Exhibit A-31.[14] It is not clear at this point why any particular answer seizure ratio represents an acceptable or unacceptable level of performance on the part of an intermediate carrier or even an appropriate trigger for investigation. Any information the parties might be able to supply in this respect would be helpful.

30. As observed in OCA's report in *Frahm*, ¶ 84, {[redacted]}.

Impact Responses

31. According to Impact Telecom (Impact),[15] Impact was contacted by IntelePeer on January 30, 2013, in reference to two specific calls, the first at 14:37:53 and the second at 14:39:17 Greenwich Mean Time (GMT) on January 15, 2013. Impact subsequently investigated these and other calls placed that morning. OCA Exhibit IM-2,

[14] In an e-mail, Airus advised that {[redacted]}.

[15] According to its website, Impact "owns and operates a state-of-the-art Voice over IP network which carries billions of minutes every month, including the largest implementation of an IP-based network connected to a nationwide Feature Group D (FGD) network."

IM-5, IM-12.[16] OCA appreciates the informative call detail records and the analysis provided by Impact.[17]

32. According to Impact, the first call referenced by IntelePeer was presented to Impact, presumably by IntelePeer, and was delivered by Impact to third-tier intermediate carrier InterMetro.[18] The call rang for 11 seconds (approximately 3 rings), at which point IntelePeer sent Impact a cancellation request (code 487). The cancellation request indicated that the calling party had hung up without the called party having answered. It instructed Impact to end the call, which Impact did. At the time, according to Impact, IP packets were traversing in both directions, meaning that an audio channel was open and audio was present in the call system. OCA Exhibit IM-2.[19]

33. A plausible explanation for what happened, consistent with the information provided by Hancock County Health Systems, CenturyLink, IntelePeer and Impact, is supplied by the fact that IntelePeer was the *second* rather than first intermediate carrier in the sequencing in CenturyLink's routing table. Impact could only measure the post-dial delay from the time IntelePeer subtended the call to Impact. Prior to that time, CenturyLink would presumably have subtended the call to the first intermediate carrier in its sequencing.

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[16] {[redacted]}. See note 12 above.

[17] In a letter to Board staff dated March 7, 2013, Impact stated: "We measure every call attempt with PDD metrics so we are very aware of customer or vendors that have issues." As appears below, the record substantiates this statement.

[18] According to its website, InterMetro "own[s] and operate[s] a national, private, proprietary voice-over Internet Protocol (VoIP) network infrastructure powered by state-of-the-art switching equipment."

[19] The fact that packets are traversing in both directions does not necessarily mean that the packets are being assembled into a conversation. Footnote OCA's.

34. From the perspective of Hancock County Health Systems, which alleged in its complaint not only "calls won't ring" but also "calls won't answer," any pre-IntelePeer and pre-Impact delay would make it appear that the call "won't answer." The cumulative effect of the sequencing would produce a classic post-dial delay in which the calling party hangs up before the called party answers.

35. The plausibility of this explanation reinforces OCA's previous observation that companies, through advance testing and otherwise, need to reduce failed attempts and instead to complete calls more frequently using the first attempted intermediate provider. See *In re Complaint of Rehabilitation Center of Allison*, No. FCU-2012-0019, OCA report, ¶¶ 82-86.[20]

36. According to Impact, the second call referenced by IntelePeer was received by Impact from IntelePeer and delivered by Impact to third-tier intermediate carrier Broadvox Communications.[21] The call had 1 second of post-dial delay, 7 seconds of ring time and 15 seconds of duration. The call was "completed as indicated by a 200 Normal BYE (a signal in the call stream indicating the call was answered)" received from Broadvox. Impact then delivered the call ("and all media") to IntelePeer. OCA Exhibit IM-5.

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[20] In a letter to Board staff dated March 7, 2013, Impact advised that, generally speaking, any post-dial delay under 3 seconds is an acceptable number, although some calls can take longer, such as calls to Alaska or calls to cell phones. The fact that Impact views 3 seconds or less as an appropriate metric for post-trial delay supports OCA's previous observation that the FCC's reliance on a metric of eight seconds or less is arguably too long. See *In re Complaint of Rehabilitation Center of Allison*, OCA report filed Dec. 19, 2014, ¶¶ 83-84; *In re Complaint of UnityPoint Clinic Family Medicine at Huxley*, OCA report filed Jan. 9, 2015, ¶ 34.

[21] According to its website, Broadvox "is a leading domestic and international provider of IP Communications" using "cloud-based communications and applications."

37. In Impact's analysis, however, the call could still have failed, because Impact, as an intermediate carrier, cannot see the final outcome of the call after it delivers the call to its upstream carrier. To know what happened, and, if the call failed, why it failed, one would need to construct a "call ladder" with the call detail records of all of the carriers in the call path. OCA Exhibit IM-5.[22]

38. In response to a question asking for insights into how one company's system can indicate a call was completed while another company's system can indicate the call was not completed, Impact referenced its analysis of the two calls discussed above. As to the first, it said, Impact only knows that IntelePeer delivered a cancellation request instructing Impact to terminate the call, which Impact did. As to the second, Impact cannot know what happened to the call after the call was delivered upstream to IntelePeer. To know what happened, and, if a call failed, why it failed, Impact repeated, one would need to construct a "call ladder" with the call detail records of all of the carriers in the call path. OCA Exhibit IM-15.

39. OCA agrees that construction of such an all-carrier "call ladder" would reveal what happened to a call. In normal operations, however, and subject to a recognition that an incorrect or falsified signal can mask problems such as looping or intentional blocking,[23] it should also be possible to determine whether a call completed,

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[22]In response to an inquiry asking whether Impact has an explanation for the difficulties reported by Hancock County Health Systems, Impact responded that Hancock County Health Systems is not a direct customer of Impact, so Impact is not in a position to contact Hancock County Health System in order to conduct testing of the calls to determine the reasons why it was experiencing difficulties. OCA Exhibit IM-9.

[23]*In the Matter of Rural Call Completion*, 28 F.C.C.R. 16154 (FCC 2013), ¶ 71.

without constructing a "call ladder," by checking whether the terminating local exchange carrier provided "answer supervision" on the call.[24]

40. Impact produced a spreadsheet showing the call detail records of the eleven (11) calls processed by Impact on January 15, 2013, from the 641-843 NPA-NXX of the Britt facility to the 641-762 NPA-NXX of the Kanawha facility, including the two calls discussed above, which Impact highlighted in yellow. All 11 of these calls were calls from the Britt facility to the Kanawha facility during the 15-minute period beginning 14:24:33 and ending 14:39:42 GMT. OCA Exhibit IM-12.

41. The spreadsheet shows an "answer time" for the first and tenth calls, probably indicating that answer supervision was received from the terminating local exchange carrier in Kanawha and hence (absent incorrect or falsified signaling) that the call was completed.25 The first call was 41 seconds from "start" to answer and 23 seconds from answer to release. The tenth call was 8 seconds from "start" to answer and 15 seconds from answer to release. OCA Exhibit IM-12.[26]

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[24]"Follow this scenario: I call you long distance. My central office must know when you answer your phone so my central office can start billing me for the call. It works like this: when you, the called party, answer your phone, your central office sends a signal back to my central office (the originating CO). This tells my central office to start billing me for the call. This signal is called Answer Supervision." *Newton's Telecom Dictionary*, 15th ed. (1999).

[25] {[redacted]}.

[26]In an environment in which carriers are handing calls to other carriers, often on successive attempts, "start" time can potentially have different meanings. In a letter to Board staff dated March 7, 2013, Impact stated that "post-dial delay" is "the duration that lapses *from the time we receive a call* (from IntelePeer in this case) to the time we connect that call to the vendor and the customer begins to hear ring. For the caller, it is *the time that they dial the number* until the time that they hear a ring." The time that the caller completes dialing and the time that Impact receives a call are the same only if no time elapses in between. Impact may be saying there is no time lapse. Clarification and input from the parties on this issue would be helpful. See *In re Complaint of Rehabilitation Center of Allison*, No. FCU-2012-0019, OCA report filed Dec. 19, 2014, confidential ¶ 85.

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42. The spreadsheet shows {[redacted]}. OCA Exhibit IM-12. "CPS" refers to "calls per second."

43. On each of the other four calls (the first, second, eighth and tenth), including the two that completed, Impact needed to try more than one downstream carrier, because the carrier in the first position in its sequencing was unable to complete the call. On two of the calls (the second and tenth), the carrier in the second position in Impact's sequencing was also unable to complete the call, so Impact proceeded to try the carrier in its third position. OCA Exhibit IM-12.

44. {[redacted]}. OCA Exhibit IM-12.

45. It thus appears that lack of physical capacity was a major cause of the difficulties reported by Hancock County Health Systems. This finding is consistent with findings in other cases. See *In re Complaint of Frahm*, No. FCU-2013-0007, OCA report

filed Nov. 13, 2014, ¶¶ 18-24. In this case, the capacity constraints that caused the difficulties for Hancock County Health Systems were both upstream and downstream from Impact.

46. When asked whether it is aware of other complaints regarding call completion failures to the 641-762 NPA-NXX, Impact responded its records show only one such other complaint since January 1, 2011. The trouble ticket on that complaint was opened by IntelePeer in relation to a call dated January 16, 2013. Impact tested the call, confirmed the presence of "dead air," and removed the downstream carrier (Broadvox) from the route. Calls then completed successfully. OCA Exhibits IM-10, IM-11.

47. In response to a question asking whether the use of IP switching technology at some point in a call path may have an effect on whether a call attempted actually goes through, Impact responded: "IP switching technology for voice call transmission has been in existence for many years. Impact Telecom cannot say with certainty whether IP switching technology at some point in a call path may have any effect on call completion." OCA Exhibit IM-16.

48. Section 8 of the contract between Impact and InterMetro, {[redacted]}. The same section, {[redacted]}. Section 15 of the contract {[redacted]}. OCA Exhibit IM-4.

49. Section 3 of the contract between Impact and Broadvox, {[redacted]}. The same section, {[redacted]}. OCA Exhibit IM-7.

50. The FCC has not made inquiry of Impact regarding possible call completion failures. On May 31, 2013, however, after the calls at issue in this case were carried, Impact acquired a carrier that had received a letter of inquiry from the FCC pre-acquisition, while under the control of its prior management.[27] OCA Exhibit IM-14.

51. {[redacted]}. See *In re Complaint of Rehabilitation Center of Iowa*, No. FCU-2012-0019, OCA report filed Dec. 19, 2014, ¶ 47.[28]

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[27] As indicated on Impact's website, Impact acquired Matrix Telecom in 2013. On February 4, 2014, the FCC and Matrix settled FCC allegations that Matrix had violated federal laws by failing to complete long distance calls to rural areas on a just, reasonable and non-discriminatory basis. *In the Matter of Matrix Telecom, Inc.*, 29 F.C.C.R. 5709 (FCC 2014). As stated in the consent decree, in the months immediately following its receipt of the letter of inquiry, Matrix significantly reduced the number of intermediate providers it used to deliver long distance calls to rural areas. As a result of those routing changes, Matrix's call completion performance to rural areas substantially improved. Also, after it received the letter of inquiry, Matrix made significant investments to upgrade its network and related operations to improve rural call completion performance. *Id.*, ¶ 10.

[28] Prior to its acquisition by Impact, Matrix Telecom (see note 27) had itself acquired Excel Telecommunications. *In the Matter of Matrix Telecom, Inc.*, 29 F.C.C.R. 5709 (FCC 2014), ¶ 8. According to data provided by CenturyLink in No. FCU-2012-0019, *In re Complaint of Rehabilitation Center of Allison*, {[redacted]}. See OCA report, filed Dec. 19, 2014, ¶ 47. According to information provided by Airus

52. When asked whether Impact can offer assurances that the problems complained of by Hancock County Health Systems will not recur in the future, Impact responded that its downstream carriers have been thoroughly tested and that it continues to terminate calls to the Kanawha NPA-NXX for other upstream carriers without issue. Impact is willing to conduct end-to-end testing. It is participating with other carriers in a National Call Testing Project jointly sponsored by the National Exchange Carrier Association and the Alliance for Telecommunications Industry Solutions and hopes through this participation to gain a better understanding of the issue.[29] OCA Exhibit IM-17.

53. On August 18, 2014, in response to a question from Board staff in another file asking for Impact's long-term solutions to the call completion problems, Impact stated it is implementing a plan to improve call completion issues, particularly in rural areas. The plan includes reducing the number of intermediate carriers and relying primarily on "tier 1" carriers. In Iowa, the company also recently completed an interconnection agreement directly with Iowa Network Services (INS) to provide further quality control as well as redundancy to the connections already in place. The company is also prioritizing complaints to rural codes[30] and dropping vendors within higher connection issues.

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and submitted by OCA in Docket No. FCU-2013-0007, *In re Complaint of Frahm*, {[redacted]}. See OCA report, filed Nov. 13, 2014, ¶ 82.

[29]OCA has included with the exhibit a copy of the joint NECA/ATIS press release, dated August 23, 2013, referenced in the data request response. Information regarding material progress this project may have made in understanding and addressing the problems would be helpful.

[30]In an attempt to identify and resolve rural completion call issues more quickly, such complaints are now assigned a rural code and route directly to a compliance officer and a team that deals specifically with rural call issues. OCA Exhibit IM-21.

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54. Impact states: "For routing purposes, the fewer carriers involved in a call, generally the better." When asked to provide its understanding of the term "tier 1" carrier, Impact responded that "tier 1" is "top tier or best." These carriers typically own the copper and other facilities and require fewer intermediaries. Thus, incumbent local exchange carriers (ILECs) such as AT&T and Verizon are generally regarded as tier 1 carriers. Impact adds that not every ILEC is necessarily a tier 1 provider or a tier 1 provider for every location. Nor do tier 1 providers necessarily own the copper. They may be resellers that possess routes that are able more successfully to complete and maintain calls. OCA Exhibit IM-19.[31]

55. Section 4.4 of the contract between Impact and INS, {[redacted]}. Section 4.7 {[redacted]}. The contract {[redacted]}.

OCA Exhibit IM-20 (exhibit pages 7, 11-12).

[31]In April 2010, the FCC regarded the following "IXCs/ISPs," evidently among others, as tier 1 carriers: ATT, Sprint, GX, Verizon Business, Level 3, XO, TWTC. *In the Matter of Connect America Fund*, 25 F.C.C.R. 6657 (Apr. 21, 2010), p. 128.

[32]Local Exchange Routing Guide, Traffic Routing Administration. Footnote OCA's.

Concrete Steps toward a Long-Term Solution

56. The following are concrete steps that CenturyLink, Airus and Impact should take as elements of a long-term solution to the problem. These suggested actions are intended to complement the work of the FCC, including the data collection and reporting to be implemented pursuant to the FCC rules. These suggested actions are also appropriate for consideration in a rule-making proceeding, which could afford long-term solutions industry-wide.

Step 1

Acknowledge responsibility for the performance of downstream carriers.

57. The FCC has recently emphasized in a related context the need for "end-to-end" carrier responsibility and accountability from the time a call is placed to the time it is completed.[33] Such end-to-end responsibility is a prerequisite to solving the rural call completion problem. The first step in a long-term solution to the problem is for originating and upstream intermediate carriers to acknowledge responsibility for the performance of the downstream intermediate carriers they engage to complete the calls.

[33] "April 2014 Multistate 911 Outage: Cause and Impact, Report and Recommendations," Public Safety Docket No. 14-72 (FCC Oct. 2014). Although the focus of the report was the vulnerability of the 911 system, the factors that account for this vulnerability, including the increasing reliance of IP-supported networks on geographically remote servers and on software-based components to support key functions, are equally applicable to the public telephone network as a whole.

Step 2

Maintain on file with the Board a list of downstream carriers currently being used to carry Iowa traffic.

58. A simple filing of this character, with contact information for the downstream carriers, updated as changes occur, will keep the Board apprised of the identity of the companies that are carrying the Iowa traffic.

Step 3

Reduce the number of intermediate providers in the call paths.

59. A key reason for the increased problems in rural areas is that a call is often handled by numerous different providers, the identities of which may not even be known to the originating provider, resulting in nearly untraceable call routes. *In the Matter of Rural Call Completion*, 28 F.C.C.R. 16154(Nov. 8, 2013) ¶¶ 17, 87, 88. A provider that limits the number of intermediate providers in the call path is better able to manage performance to rural destinations than a provider that sends calls through numerous intermediate providers. Limiting the number of intermediate providers also limits the potential for lengthy setup delay and looping. *Id.* If a carrier can implement the "safe harbor" in the federal rules by limiting the number of intermediate providers on a call path to two or fewer, see 47 C.F.R. § 2107, as CenturyLink is proposing to do, that will help remediate the call failures. Even if a carrier cannot implement the safe harbor, or even if it is not subject to federal reporting requirements, it may be able to reduce the number of intermediate carriers in its call paths. The reductions can be accomplished either through new interconnection agreements or through new construction.

Step 4

Promote transparency in the use of downstream carriers.

60. Prior to the time that federal and state authorities began to investigate the rural call completion failures, many of the intermediate carriers were hidden from view. Some continue to resist relevant disclosures. The lack of transparency lessens accountability. It also hampers the Board's ability to understand and address the difficulties. Under the FCC's rules, as one of the conditions for the safe harbor, covered providers must certify that any nondisclosure agreements with intermediate providers permit disclosure of the identity of the intermediate provider and any additional intermediate providers to the Commission and the affected rural local exchange carrier. 47 C.F.R. § 64.2107. Regardless of whether a carrier takes advantage of the federal safe harbor, and regardless of whether a carrier is subject to federal reporting requirements, a commitment to certify that any nondisclosure agreement permits disclosure to the Board of both the identity of any intermediate providers and the relevant contract would increase transparency and therefore contribute to a long-term solution.

Step 5

Actively participate in the standard-setting work of the Alliance for Telecommunications Industry Solutions.

61. The FCC has applauded efforts by the Alliance for Telecommunications Industry Solutions (ATIS) to diagnose problems in call routing, cooperate on finding solutions and adopt best practices aimed at solving the problem. *In the Matter of Rural Call Completion*, 28 F.C.C.R. 16154 (FCC Nov. 8, 2013) ¶ 12. Such efforts must

continue, because the development of industry standards for call completion has not been completed.[34] Because all carriers must interconnect with the same public telephone network, and because interoperability and coordination are needed across all components of the network, wide industry participation in this work will help. The metrics must be specific to the particular technologies. When and as new standards are developed, companies should report them to the Board, so the Board can ensure they adequately protect consumers and are followed. In time, as the standards are more fully developed for all technologies, the Board, either on its own for intrastate calls or in partnership with the FCC for all calls, should consider giving these standards, or some of them, with any modifications that public comment may require, the force and effect of law. See and compare 199 IAC 22.5(3).[35]

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[34]Through its Next Generation Interconnection Interoperability Forum (NGIIF), ATIS has worked with carriers and utility commissions to generate an "Intercarrier Call Completion/Call Termination Handbook" (ATIS Handbook) that describes industry standards and best practices that carriers can follow to address call completion issues and manage intermediate carriers. See *In re Complaint of Frahm*, No. FCU-2013-0007, Verizon resistance to motion to compel, filed July 11, 2014, p. 5. The ATIS Handbook, approved August 2012 and updated March 2013, is an excellent start at addressing the technical challenges but is not a finished product. On its own terms, it is "a living document" describing "some" of the problems being encountered and discussing "some" of the industry standards and practices relevant to ensuring call completion, particularly signaling, routing and trouble handling. ATIS Handbook, § 1.1. According to the handbook, carriers need to establish "Direct Measures of Quality" ("DMoQs"), such as "Call Completion Rate" and "Post Dial Delay," for their vendors to meet. The handbook does not, however, provide any standard or norm for what an acceptable metric value might be. See ATIS Handbook, § 5.6 and Table 2. Some of the SIP (Session Initiation Protocols) mechanisms are not yet standardized. ATIS Handbook, § 4.1.1.3.

[35]The cited subrule contains specific standards that local exchange carriers must meet, among them: (i) complete dialing of called numbers on at least 97 percent of calls without encountering an all-trunks-busy condition, during average busy-season busy-hour; and (ii) properly tested alarms on a 24-hour basis to indicate improper functioning of equipment.

Step 6

Exercise responsibility over the use of downstream intermediate carriers.

62. Each originating and intermediate carrier that makes use of downstream intermediate carriers should have sound policies in place addressing each of the following elements.

- Establish and conduct standardized testing routines;
- Investigate on an ongoing basis whether downstream carriers have properly designed and properly functioning equipment, including properly designed and properly functioning software;
- Investigate on an ongoing basis whether downstream carriers have sufficient capacity in their switches and call paths to carry the traffic to the intended destinations;
- Require each downstream carrier on an ongoing basis to provide specific information regarding its system and the limitations of its system, including information regarding any difficulties its system may have interoperating with other systems using a different technology;[36]
- Require each downstream carrier on an ongoing basis to provide specific information regarding any bandwidth or other capacity constraints that would prevent its system from completing calls to particular destinations at busy times;
- Require each downstream carrier to have properly designed and properly functioning alarms in its system so as to ensure immediate notice of any outages on its system;
- Require each downstream carrier to have properly designed and properly functioning mechanisms in place to ensure that the downstream carrier, if unable to complete a call, timely releases the call back to the upstream carrier (ATIS Handbook § 5.3);
- Require each downstream carrier to have properly designed and properly functioning mechanisms in place to ensure that the downstream carrier, if

[36]The need for such sharing of information will commonly override a carrier's desire to treat the information regarding its system as confidential.

- making successive attempts to route the call through different lower-tiered downstream carriers, timely passes the call to a second (or third or fourth) lower-tiered downstream carrier if a first (or second or third) lower-tiered downstream carrier cannot complete it;

- Require each downstream carrier to have properly designed and properly functioning mechanisms in place to detect and control looping, including the use of hop counters or other equivalent mechanisms that alert a carrier to the presence of a loop (ATIS Handbook § 4.1.3);

- Establish direct measures of quality and require downstream carriers to meet them (ATIS Handbook, § 5.6 and Table 2);

- Establish and implement appropriate sanctions for intermediate carriers that fail to meet standards;

- Require downstream carriers to manage lower-tiered downstream carriers and to hold lower-tiered downstream carriers to the same standards to which they themselves are held (ATIS Handbook § 5.8);

- Define the responsibilities of downstream carriers in an agreement (ATIS Handbook § 5 introduction).

Step 7

Provide copies of the Iowa portion of the federal data and the FCC's analysis of the Iowa data to the Board and OCA.

63. The Board cannot effectively evaluate problems and ensure the implementation of successful solutions without ready access to relevant sources of information. Nor can OCA adequately discharge its responsibilities to Iowa consumers without such access. The FCC's data collection processes, including the generation of call answer rate (CAR) and network effectiveness ratio (NER) statistics for each rural operating company number (OCN), including each rural OCN in Iowa, together with the

FCC's analysis of these metrics, is specifically designed to provide relevant sources of information. For that reason, the Iowa data and the FCC's analysis of them would assist the Board in addressing the rural call completion problem in Iowa and assist OCA in representing the interests of Iowa consumers. On an ongoing basis, a company reporting to the FCC should therefore provide copies of its Iowa data and the FCC's analysis of the Iowa data to the Board and OCA.

Step 8

Keep routing tables up-to-date.

64. Accurate routing tables are essential to successful call completion. *In the Matter of Rural Call Completion*, 28 F.C.C.R. 15164 (Nov. 8, 2013) ¶ 42 & n. 49. If the tables are not properly updated, for example, some calls may fall into a loop and never be set up. In the Matter of Rural Call Completion, 28 F.C.C.R. 1569 (Feb. 7, 2013) (separate statement of Commissioner Ajit Pai). Due to consumer elections to switch carriers and to local number portability, among other factors, these tables are changing constantly. Routing tables must therefore be kept up-to-date. The updating should be done through the Local Exchange Routing Guide (LERG) of the Traffic Routing Administration.

Step 9

Provide periodic progress reports to the Board on implementation.

65. Each company should provide periodic reports to the Board regarding the progress it is making in fulfilling any commitments it makes.

Conclusion

OCA submits this report, to be read in conjunction with the reports referenced in paragraph 1, setting forth the results of its investigation and its conclusions regarding concrete steps that the companies can take toward a long-term solution.

Respectfully submitted,

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